

Claims:-

1. A method of producing a desired protein, polypeptide or peptide, comprising the step of:

5 culturing a mammalian host cell in culture medium, wherein said host cell includes:

(i) at least one introduced DNA sequence encoding the desired protein, polypeptide or peptide expressibly linked to a first inducible promoter sequence,

10 (ii) at least one introduced DNA sequence encoding a protein, polypeptide and/or peptide factor(s) required for growth of the host cell in said culture medium expressibly linked to a promoter sequence, the expression of which is regulated by a repressor binding region; and

15 (iii) at least one introduced DNA sequence encoding a repressor molecule which binds to the repressor binding region, expressibly linked to a second inducible promoter sequence.

wherein the first and second inducible promoter sequence(s) may be the same or different.

20 2. A method according to claim 1, wherein the first and second, inducible promoter sequence(s) are the same, and said culturing step comprises:

25 a first stage of culturing said host cell to a desired cell confluence, and a second stage of culturing said host cell in the presence of an inducer of said first and second inducible promoter sequence(s).

3. A method according to claim 1 or 2, wherein the said repressor binding region is a *lac* operator sequence, and said at least one DNA sequence encoding a repressor molecule encodes a *lac* repressor.

4. A method according to any one of claims 1 to 3, wherein the first and second, inducible promoter sequence(s) is/are selected from the group consisting of the human metallothionein IIA promoter and the modified human metallothionein IIA promoters, M(1)2 and M(2)6.

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5. A method according to claim 4, wherein the host cell further includes and expresses a DNA sequence encoding a metallothionein.

6. A method according to any one of the preceding claims, additionally comprising the step of recovering the desired protein, polypeptide or peptide.

7. A method for the regulated growth of a mammalian host cell in a culture medium, comprising the step of:-

15 culturing said mammalian host cell in said culture medium, wherein said host cell includes:

(i) at least one introduced DNA sequence encoding a protein, polypeptide and/or peptide factor(s) required for growth of the host cell in said culture medium expressibly linked to a promoter sequence, the

20 expression of which is regulated by a repressor binding region; and

(ii) at least one DNA sequence encoding a repressor molecule which binds to the repressor binding region, expressibly linked to an inducible promoter sequence.

25 8. A method according to claim 7, wherein the said repressor binding region is a *lac* operator sequence, and said at least one DNA sequence encoding a repressor molecule encodes a *lac* repressor.

30 9. A method according to claims 7 or 8, wherein the inducible promoter sequence(s) is/are selected from the group consisting of the human

metallothionein IIA promoter and the modified human metallothionein IIA promoters, M(1)2 and M(2)6.

10. A method according to claim 9, wherein the host cell further
5 includes and expresses a DNA sequence encoding a metallothionein.

11. A method according to any one of the preceding claims, wherein the
DNA sequence(s) encoding the protein, polypeptide and/or peptide growth
factors(s) encodes a growth factor(s) selected from the group consisting of
10 insulin, modified insulins, insulin-like growth factors, cytokines, mitogenic
proteases and mixtures thereof.

12. A method according to claim 11, wherein the DNA sequence(s)
encoding the protein, polypeptide and/or peptide growth factor(s) encodes
15 insulin or an insulin-like growth factor.

13. A method according to claim 11, wherein the DNA sequence(s)
encoding the protein, polypeptide and/or peptide growth factor(s) encode
insulin or an insulin-like growth factor, and transferrin.
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14. A method according to any one of the preceding claims, wherein the
culture medium is protein/serum-free medium.

15. A method according to any one of the preceding claims, wherein the
25 mammalian host cell is a Chinese hamster ovary cell.

16. A method according to any one of the preceding claims, wherein the
mammalian host cell is a CHO-K1 cell.

17. A host cell including:

14 (i) at least one introduced DNA sequence encoding a desired protein, polypeptide or peptide expressibly linked to a first inducible promoter sequence;

15 (ii) at least one introduced DNA sequence encoding a protein, polypeptide and/or peptide factor(s) required for growth of the host cell in a protein/serum-free culture medium, expressibly linked to a promoter sequence, the expression of which is regulated by a repressor binding region; and

16 (iii) at least one introduced DNA sequence encoding a repressor molecule which binds to the repressor binding region, expressibly linked to a second inducible promoter sequence, wherein the first and second inducible promoter sequence(s) may be the same or different.

17 18. A host cell according to claim 17, wherein the first and second inducible promoter sequence(s) are the same.

18 19. A host cell according to claim 17 or 18, wherein the said repressor binding region is a *lac* operator sequence, and said at least one DNA sequence encoding a repressor molecule encodes a *lac* repressor.

20 21. A host cell according to any one of claims 17 to 19, wherein the first and second inducible promoter sequence(s) is/are selected from the group consisting of the human metallothionein IIA promoter and the modified human metallothionein IIA promoter, M(1)2 and M(2)6.

22 23. A host cell according to claim 20, wherein the host cell further includes and expresses a DNA sequence encoding a metallothionein.

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22. A host cell including:

(i) at least one introduced DNA sequence encoding a protein, polypeptide and/or peptide required for growth of the host cell in a protein/serum-free culture medium, expressibly linked to a promoter sequence, the expression of which is regulated by a repressor binding region; and

(ii) at least one introduced DNA sequence encoding a repressor molecule which binds to the repressor binding region, expressibly linked to an inducible promoter sequence.

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23. A host cell according to claim 22, wherein the said repressor binding region is a *lac* operator sequence, and said at least one DNA sequence encoding a repressor molecule encodes a *lac* repressor.

15 24. A host cell according to claim 22 or 23, wherein the inducible promoter sequence(s) is/are selected from the group consisting of the human metallothionein IIA promoter and the modified human metallothionein IIA promoter, M(1)2 and M(2)6.

20 25. A host cell according to claim 24, wherein the host cell further includes and expresses a DNA sequence encoding a metallothionein.

26. A host cell according to any one of claims 17 to 25, wherein the DNA sequence(s) encoding the protein, polypeptide and/or peptide growth factors(s) encodes a growth factor(s) selected from the group consisting of insulin, modified insulins, insulin-like growth factors, cytokines, mitogenic proteases and mixtures thereof.

27. A host cell according to claim 26, wherein the DNA sequence(s) encoding the protein, polypeptide and/or peptide growth factor(s) encodes insulin or an insulin-like growth factor.

5 28. A host cell according to claim 26, wherein the DNA sequence(s) encoding the protein, polypeptide and/or peptide growth factor(s) encode insulin or an insulin-like growth factor, and transferrin.

10 29. A host cell according to any one of claims 17 to 28, wherein the mammalian host cell is a Chinese hamster ovary cell.

30. A host cell according to any one of claims 17 to 29, wherein the mammalian host cell is a CHO-K1 cell.